



PATENT
Attorney Docket No. 401256

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

GOTOU et al.

Application No. 09/881,665

Filed: June 18, 2001

For: HIGH FREQUENCY POWER
AMPLIFIER

Art Unit: 2817

Examiner: H. Choe

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TRANSMITTAL OF
APPELLANTS' APPEAL BRIEF

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OFFICE OF PETITIONS

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In accordance with 37 CFR 1.192, appellants hereby submit Appellants' Brief on Appeal in triplicate.

The items checked below are appropriate:

1. Status of Appellants

This application is on behalf of ☒ other than a small entity or ☐ a small entity.

2. Fee for Filing Brief on Appeal

Pursuant to 37 CFR 1.17(c), the fee for filing the Brief on Appeal is for: ☒ other than a small entity or ☐ a small entity.

Brief Fee Due \$330.00

3. Oral Hearing

☐ Appellants request an oral hearing in accordance with 37 CFR 1.194.

4. Extension of Time

☐ Appellants petition for a one-month extension of time under 37 CFR 1.136, the fee for which is \$110.00.

- ☒ Appellants believe that no extension of time is required. However, this conditional petition is being made to provide for the possibility that appellants have inadvertently overlooked the need for a petition and fee for extension of time.

Extension fee due with this request: \$

5. Total Fee Due

The total fee due is:

Brief on Appeal Fee	\$330.00
Request for Oral Hearing	\$ 0.00
Extension Fee (if any)	\$ 0.00

Total Fee Due: \$330.00

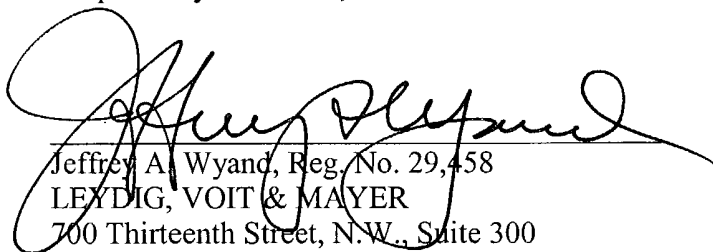
6. Fee Payment

- ☐ Attached is a check in the sum of \$
- ☒ Charge Account No. 12-1216 the sum of \$330.00. A duplicate of this transmittal is attached.

7. Fee Deficiency

- ☒ If any additional fee is required in connection with this communication, charge Account No. 12-1216. A duplicate copy of this transmittal is attached.

Respectfully submitted,



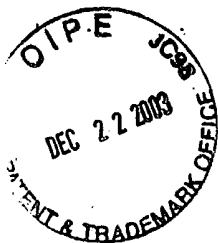
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Date: Dec 4, 2003

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APPELLANTS' APPEAL BRIEF

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Alexandria, VA 22313-1450

Dear Sir:

In furtherance of their appeal, Appellants now present their Brief.

Real Party In Interest

The real party in interest is Mitsubishi Denki Kabushiki Kaisha.

Status of Claims

The application was filed with nine claims. Pursuant to a species election requirement and an election, claims 1-8 were examined. Non-elected claim 9 was ultimately cancelled. In the course of prosecution, including an Amendment After Final Rejection, discussed below, claims 3, 4, 6, and 7 were cancelled, leaving claims 1, 2, 5, and 8 pending. Claims 1 and 2 are allowed.

Claims 5 and 8 are finally rejected and it is the rejection of those two claims which is appealed. The rejected claims, claims 5 and 8, that are believed to be pending in this patent application and that will be pending upon the granting of a Petition filed simultaneously with this Brief, appear in the Appendix.

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Status of Amendments

Subsequent to the final rejection, on July 25, 2003, Applicants filed an Amendment canceling claims 6 and 7 and combining claims 5 and 6 as amended claim 5. In response to this Amendment, after nearly two and on half months, an Advisory Action was mailed on October 8, 2003. This Advisory Action erroneously stated that new limitations were added in the Amendment that would require further consideration and search. The Advisory Action confirmed that claims 1 and 2 were allowed, and stated that the Amendment would not be entered for purposes of appeal so that claims 5-8 were still pending and finally rejected.

Because it had been pointed out in the Amendment After Final Rejection that claims 5 and 8 as presented there were identical to claims 6 and 7 that had been previously pending and examined, an informal inquiry was made about the Advisory Action. In reply, the Examiner sent by facsimile on October 15, 2003 a second Advisory Action. That Advisory Action was devoid of information. The second Advisory Action again confirmed that the Amendment did not place the application in form for allowance but failed to state whether the Amendment would be entered upon appeal and did not state the status of the pending claims.

Because amended claims 5 and 8 are identical to examined claims 6 and 7 that were cancelled in the Amendment after Final Rejection, it is apparent that claims 1, 2, 5, and 8, are pending in this application. The potential refusal of the Examiner to enter the Amendment After Final Rejection is the subject of the simultaneously filed Petition. The Petition points out, again, the identity between amended claims 5 and 8 and examined, but now cancelled, claims 6 and 7, so that no new issue was raised by the Amendment and that the Amendment must therefore be entered for the purposes of this Appeal.¹

Summary of Invention

The invention pertains to a power amplifier typically used in the microwave frequency range or at still higher frequencies, with distributed parameter transmission lines. The invention as defined by claims 5 and 8 particularly encompasses the disclosure in the patent application under the heading First Embodiment at pages 3-6 of the patent application.

In a power amplifier according to the invention, a transistor is employed for amplifying signals, for example as shown in Figure 1 of the patent application. A series of transmission lines having lengths adjusted to achieve a particular impedance function at a

¹ As an alternative, if claims 5-8 were still pending, Appellants would abandon claims 5 and 8 in favor of claims 6 and 7, although neither claim would be an independent claim.

basic frequency of the signal amplified by the transistor is connected to the input terminal of the transistor. These transmission lines provide an input-side impedance matching circuit. In the embodiment of Figure 1, the input-side impedance matching circuit includes five transmission lines, three of those transmission lines being connected in series and two of the transmission lines being connected to respective junctions of pairs of the three series-connected transmission lines. The input-side impedance matching circuit short circuits, i.e., provides a short-circuit load, with respect to odd harmonics of the fundamental wave, i.e., the fundamental frequency, of the signal amplified by the transistor. In addition, that impedance matching circuit provides a phase angle of reflection of the third harmonic of the fundamental wave within a range of 110° - 270° , with a reflection coefficient in a range from 0.6-1.0, viewed from the input side of the transistor.

As explained in the patent application and supported by Figure 2, the amplifier structure claimed provides improved efficiency, a critical characteristic of such high frequency solid state amplifiers.

Dependent claim 8 further specifies that the input-side impedance matching circuit includes a third harmonic reflecting circuit, a second harmonic processing circuit, and a fundamental wave matching circuit disposed sequentially with respect to the input terminal that receives an input signal for transmission to the input side of the transistor.

Issue

Are either of claims 5 and 8 obvious over Von Stein (U. S. Patent 5,886,595)?

Grouping of Claims

If the rejection of claim 5 is reversed, then the rejection of claim 8 must also be reversed. However, if the rejection of claim 5 is sustained, separate consideration must be given to claim 8 because the rejected claims do not stand or fall together.

Argument

Pending claims 5 and 8, which correspond to examined claims 6 and 7, were rejected as unpatentable over Von Stein and its Figure 1. The comments of the Official Actions pertaining to claims 6 and 7 respectively pertain to claims 5 and 8 as now pending.

The Rejection. In applying Von Stein to reject the claims on appeal, the Examiner directed attention to its Figure 1, a schematic diagram of a microwave frequency multiplier including a transistor 16 and an impedance matching network 18. Typically, such frequency multiplying circuits operate by supplying a fundamental frequency to a non-linear element that generates harmonics. A selected harmonic is amplified to provide the desired multiplied frequency output signal. In the Von Stein circuit, a fundamental signal at a frequency f_0 is produced by a signal source 10. That signal source 10 is impedance-matched to the transistor 16 through the input-matching network 18. Von Stein describes the impedance matching network as including a one-quarter wavelength open stub 38 resonant at the harmonic frequency desired to be produced by the frequency multiplier. The stub 38 provides a short circuit to reduce leakage of the desired harmonic signal from the transistor 16 toward the input terminal. In other words, because of the presence of the stub 38, the desired harmonic is reflected to the transistor 16 for amplification and supplying of the output terminal of the frequency multiplier. This part of Von Stein was asserted to meet all but the final paragraph of appealed claim 5.

In making the fundamental rejection, the Examiner stated that “as is well known, a short or open is required for reflections. It would have been obvious to have adjusted the length and width of the transmission lines to specific dimensions to achieve the desired load condition (open or short) with respect to desired number of harmonics of a fundamental wave because open or short is the required condition for [the] reflections disclosed.”

For the final paragraph of now-pending claim 5, the Examiner stated that the specific phase and angle reflection coefficient ranges of the claim would be mere “design choices”. As to now-pending claim 8, the Examiner asserted, without citation to particular parts of Figure 1 of Von Stein, that the input impedance matching circuit 18 of Stein inherently includes a third harmonic reflecting circuit, a second harmonic processing circuit, and a fundamental wave matching circuit. No further explanation of the application of Von Stein to the claims finally rejected was supplied.

The Rejection of claim 5 is Fundamentally Erroneous. It is apparent that the rejection is based upon an error in understanding transmission line technology. There is no requirement of a short circuit nor an open circuit in order to produce reflections in a distributed constant transmission line. In fact, any impedance mismatch in such a transmission line is known to produce reflections, providing the reason that impedance matching is so important in distributed constant transmission line technology.

The assertion that it would have been obvious to have adjusted lengths and widths of transmission lines to achieve particular results, such as the claimed structure, can only be

defended if the desired results are known in advance. Von Stein certainly does not provide any teaching to one of skill in the art that an input-side impedance matching circuit in an amplifier should provide a substantially short circuit load to odd harmonics of a fundamental wave being amplified to achieve improved amplifier efficiency. The closest disclosure in Von Stein to the invention of claim 5 is that a one-quarter wavelength open circuit stub should be provided for preventing reflections of a harmonic, which could be odd or even, produced in a frequency multiplier and that is the harmonic that is to be amplified. In the invention, the transistor amplifies the fundamental wave frequency, not a harmonic.

The differences between the invention and Von Stein are readily apparent. Von Stein provides an open stub quarter wavelength load to reflect a harmonic of a signal in a frequency multiplier, while the invention provides a short-circuit load to odd harmonics of a signal being amplified. These differences are too significant to conclude that Von Stein could suggest to a person of skill in the art the specific structure defined by pending claim 5.

Moreover, the present application specifies the importance of the numerical ranges of the final paragraph of appealed claim 5, formerly appearing as part of examined claim 6. These ranges are supported in the patent application from page 5, line 25 through page 6, line 22. That passage points out, with respect to Figure 2 of the patent application, the very high efficiency achieved with the phase angle range and reflection coefficient range mentioned in that final paragraph of claim 5. This passage of the specification, in combination with Figure 2 of the patent application, shows the importance of the ranges specified in that final paragraph of claim 5 and demonstrates that they are not the result of routine experimentation nor a mere optimization.

In other words, both of the final two paragraphs of amended claim 5 express important differences from what is disclosed in Von Stein, differences that are not obvious as shown by Von Stein itself or by any part of the two Official Actions rejecting that claim based solely on Von Stein.

Claim 8 is Not Inherent in Von Stein. If the rejection of claim 5 is reversed, then the rejection of claim 8 must be reversed, since claim 8 depends from claim 5. However, claim 8 also, on its own, expresses an additional difference from Von Stein and is patentable independent of the patentability of claim 5.

The Examiner's assertion that the limitation of claim 8 regarding three elements that comprise the input-side impedance matching circuit are inherent in Von Stein is not consistent with the doctrine of inherency.

“If the prior art reference does not expressly set forth a particular element of the claim, that reference may still anticipate if the element is ‘inherent’ in its disclosure.

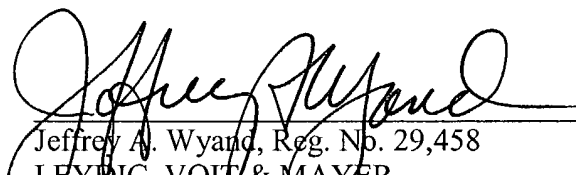
To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.' [Case citation omitted.] 'Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' [Case citations omitted] *In re Robertson*, 49 USPQ2d 1949, 1950-51(Fed. Cir. 1999). *See also, In re Oelrich*, 212 USPQ 323(CCPA 1981).

The Examiner provided no rationale nor supporting evidence that the input impedance network 18 described by Von Stein includes a third harmonic reflecting circuit, a second harmonic processing, circuit, and a fundamental wave matching circuit, the elements of the limitation of claim 8. None of these claimed elements is described either by function or structure, using any particular names, anywhere in Von Stein. These elements are, therefore, not inherent in Von Stein so that the rejection of claim 8 is erroneous and cannot be sustained.

Summary

For the foregoing reasons, the rejections of claims 5 and 8 should be reversed.

Respectfully submitted,


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Date December 22, 2003
JAW/tps

APPENDIX

CLAIMS ON APPEAL

5. A high frequency power amplifier, comprising:
a transistor for amplifying signals and having an input side; and
an input-side impedance matching circuit connected between the input side of said transistor and a signal input terminal of the amplifier, wherein
said input-side impedance matching circuit provides an impedance of a substantially short-circuit load with respect to odd number harmonics of a fundamental wave of a high frequency signal; and
a phase angle of reflection of a third harmonic is 110 to 270 degrees, and reflection is 0.6 to 1.0, with respect to a reflection coefficient when said input-side impedance matching circuit is viewed from the input side of said transistor.

8. The high frequency power amplifier according to claim 5, wherein said input-side impedance matching circuit comprises a third harmonic reflecting circuit, a second harmonic processing circuit, and a fundamental wave matching circuit, disposed sequentially from the signal input terminal.